

NEW SPECIES OF CAREX (CYPERACEAE) FROM CHIAPAS, MEXICO

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Recent field work in Mexico has disclosed two new species from Chiapas. One species belongs in sect. *Hymenochlaenae* sensu lato, one of the largest sections in the Mexican *Carex* flora, and is related to *Carex flexirostris* Reznicek; the other species is the only neotropical representative of the complex and difficult temperate sect. *Laxiflorae*.

Carex tenejapensis Reznicek & S. González, sp. nov. (sect. *Hymenochlaenae*).—

TYPE: MEXICO. Chiapas, Mpio. Tenejapa, ca. 1 km S of Tenejapa (Km 26.7) along road to San Cristóbal de las Casas, 16°49'03"N, 92°30'08"W, 2100 m, 10 Jul 1997, S. González & Reznicek 10467, M. González, M. Pinedo (holotype: IEB!; isotypes: CAS! CIIDIR! ENCB! MEXU! MICH! MO! TEX! UAMIZ! US!).

Fig. 1.

Plantae cespitosae; culmi 55–125 cm alti; vaginae basales rubescentes, glabrae vel scabrae. Folia 12–15 plerumque basalia; laminae 20–55 cm longae, 2.3–6.2 mm latae; vaginae 4–10 cm longae, stramineae, scabrae, rubrotinctae; ligulae (4–) 8–16 mm longae. Inflorescentia 18–50 cm longa; spicae 6–10; spica terminalis plus minusve erecta; spicae laterales androgynae, infimae pendulae; bracteae infimae laminis 14–34 cm longis, 1.4–4.4 mm latis et vaginis 3–5 (–7.2) cm longis. Perigynia 2.6–3.4 mm longa, 0.9–1.1 mm lata, ascendentia, trigona, viridia vel straminea, dilute rubro-guttata, glabra, in rostrum contracta; rostra 0.6–1 mm longa. Achenium ca. 1.7–2.1 mm longum, 0.8–1 mm latum. Styli marcescentes; stigmata 3. Antherae 3, ca. 1–1.8 mm longae.

Plants cespitose in dense, leafy clumps, with short rhizomes; roots brown, not densely felted with root hairs; fertile culms ca. 55–125 cm tall, ascending and arched, trigonous, smooth, with scabrous or glabrous, reddish, bladeless basal sheaths with paler reddish veins. Leaves ca. 12–15, mostly basal; blades 20–55 cm long, 2.3–6.2 mm wide, flat to plicate, more or less scabrous dorsally on the veins, the margins and midrib finely antrosely scabrous, the widest leaves 4.5–6.2 mm wide; leaf sheaths 4–10 cm long, tightly enveloping the culms, scabrous with minute reddish prickle-hairs, tinged dark purple-red; inner band of sheaths hispidulous near apex, greenish, red-tinged near the base, veined, the apex deeply concave or “V”-shaped, thin and easily splitting; ligules (4–) 8–16 mm long, acute, usually reduced on upper leaves, the very narrow free portion thickened and ciliate,

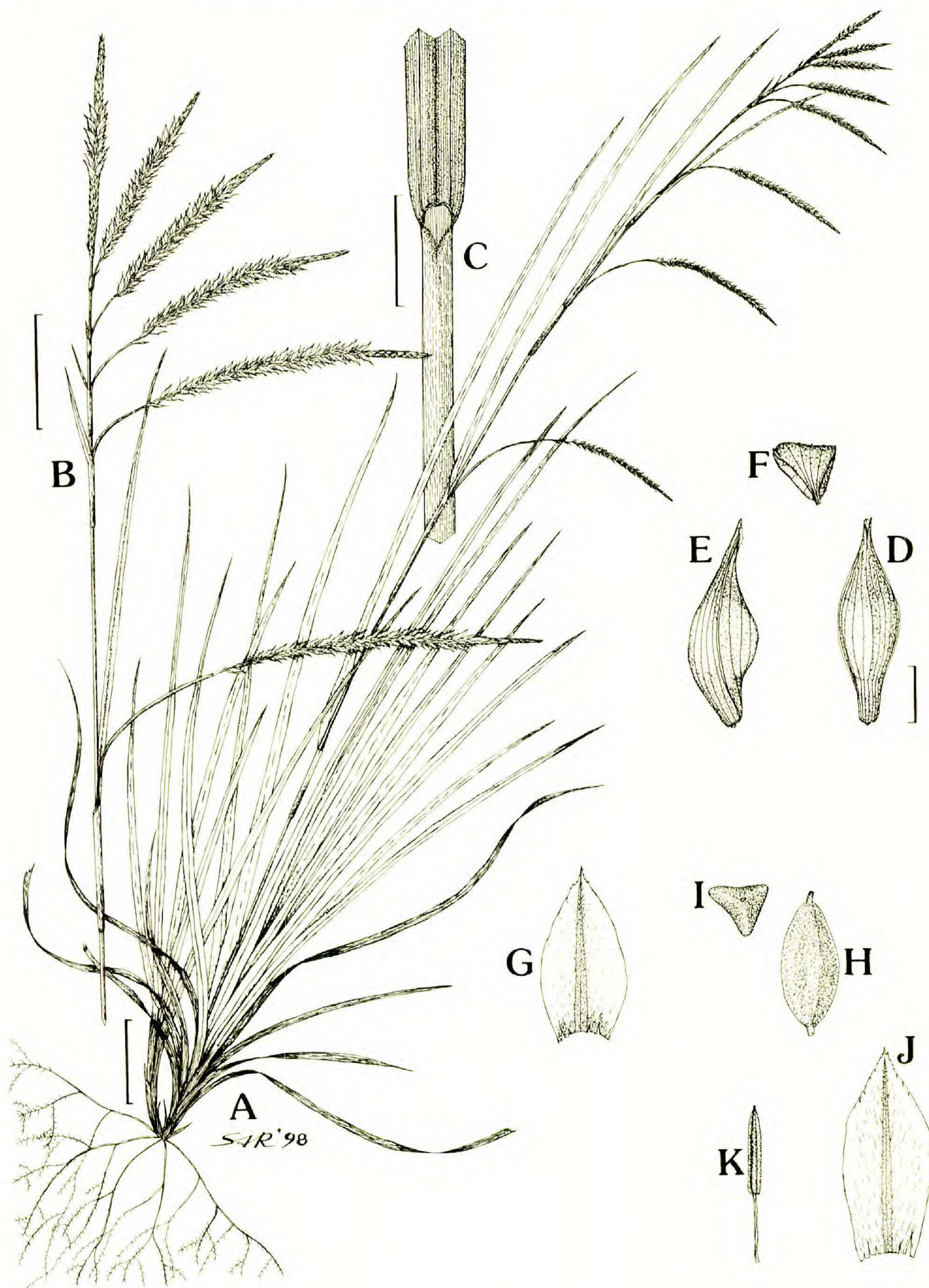


FIG. 1. *Carex tenejapensis*. A. Habit. B. Distal portion of inflorescence. C. Sheath and ligule. D. Perigynium, front view. E. Perigynium, side view. F. Perigynium, top view. G. Pistillate scale. H. Achene, front view. I. Achene, top view. J. Staminate scale. K. Stamen. Scale: A, bar = 4 cm; B, bar = 2 cm; C, bar = 1 cm; D-K, bar = 1 mm. Drawn by Susan Reznicek from the type.

reddish to stramineous to dark reddish purple. Vegetative shoots ca. 20–40 cm tall; leaves 7–13, similar to those of fertile culms; pseudoculms ca. 3.5–8 cm tall. Inflorescences ca. 18–50 cm long, with the upper 4–6 spikes overlapping and the lowest 2 spikes 7–22 cm distant; spikes single at nodes, the lower pendulous, the uppermost ascending to erect, on filiform, flexuous, scabrous peduncles; lowermost spikes with peduncles 4.5–11 cm long, the uppermost lateral spikes with peduncles ca. 0.5–1.5 cm long; lowermost bracts with blades 14–34 cm long and 1.4–4.4 mm wide, sheaths 3–5 (–7.2) cm long, otherwise similar to the leaves, the uppermost bracts much reduced. Spikes 6–10, the terminal staminate proximally and distally and pistillate in the middle, the lateral androgynous. Terminal spikes 3.1–7.6 cm long, staminate portion 18–32 mm long, 1.2–2.2 mm wide, and ca. 25–35-flowered proximally, 8–15 mm long and ca. 24–45-flowered distally; pistillate middle portion (2.5–) 9–24 mm long, 5–5.8 mm wide, (2–) 20–50-flowered; peduncles 3–6.5 mm long. Lateral spikes 2.8–7.7 cm long; staminate portion 1.5–12 mm long, ca. 3–35-flowered; pistillate portion 26–69 mm long, 4–6.1 mm wide, ca. 50–100-flowered. Pistillate scales 2.4–3.6 mm long, 1.2–1.6 mm wide, ovate, acute to acuminate, glabrous, reddish brown with narrow hyaline margins, the margins streaked with reddish brown and ciliate distally, with a prominent, distally scabrous midvein and 4–6 faintly lateral veins. Staminate scales 2.6–4 (–4.9) mm long, 1–1.6 mm wide, narrowly elliptic to ovate, obtuse to acuminate, glabrous, brown to reddish purple with narrow hyaline margins, with 1 prominent vein and sometimes with 2–4 faint lateral veins. Perigynia 2.6–3.4 mm long, 0.9–1.1 mm wide, ascending, slightly flattened-trigonous with more or less flat, narrowly elliptic sides, green to pale brown, faintly reddish dotted, glabrous, more or less cuneately tapered to the base, ca. 16–22-veined with 2 prominent and the rest fainter, contracted into a straight to slightly deflexed beak; beaks 0.6–1 mm long, green to brown, scabrous on the main veins, the apex oblique and ciliate to bidentulate, the teeth ciliate, up to 0.2 mm long. Achenes 1.7–2.1 mm long, 0.8–1 mm wide, trigonous with more or less flat, elliptic sides, tightly enveloped by the perigynium, brown, very finely papillate, tapered to the base. Styles withering; stigmas 3. Anthers 3, ca. 1–1.8 mm long.

Carex tenejapensis is known only from the type, collected in Chiapas in a shrubby opening in humid pine-oak forest on a steep limestone slope at 2100 m. Scattered clumps occurred in the most open sites among the shrubs and on rock ledges at 2700 m. Most plants were fully mature or nearly so, with some culms beginning to shed perigynia, so fruiting probably occurs from late June through July. The epithet refers to the type locality near the town of Tenejapa.

This species is an ally of *Carex flexirostris*, though it is significantly larger. In addition to the wider leaves and more numerous spikes noted in the key below, *C. tenejapensis* differs from *C. flexirostris* in being much leafier (the fertile culms with ca. 12–15 leaves versus 4–7), having larger bracts (the lowermost 14–33 cm long and 1.4–4.4 mm wide, versus 6–18 cm long and 1–1.9 mm wide), and in having anthers only 1–1.8 mm long versus 1.5–2.4 mm in *C. flexirostris*. *Carex tenejapensis* is also similar to *C. perlonga* Fern., which also can be a larger plant than *C. flexirostris*. In addition to the difference in the sheath apices noted in the key below, *C. tenejapensis* differs from *C. perlonga* in being leafier (the fertile culms with ca. 12–15 leaves versus 5–10), and in having reddish brown pistillate scales versus greenish to stramineous ones, reddish dotted perigynia versus unornamented ones, and mostly smaller perigynia [2.6–3.4 mm long versus 2.7–4.5 (–4.8) mm long]. A number of

new species have now been described in the broadly circumscribed *Carex* sect. *Hymenochlaeneae* (Reznicek 1990; Jones & Reznicek 1992; Reznicek & González 1997), and it is necessary to revise and expand the key presented in Reznicek (1986) and Jones and Reznicek (1992) to accommodate them.

KEY TO CAREX SECTION HYMENOCHLAENAE IN MEXICO AND CENTRAL AMERICA

1. Lowermost spikes erect on stiff peduncles; all peduncles but the lowermost exerted less than 1 cm beyond sheaths. *C. austromexicana.*
1. Lowermost spikes arching to pendulous on filiform, flexuous peduncles; lower and middle peduncles exerted more than 1 cm beyond sheaths, except in depauperate individuals.
 2. Perigynium body pubescent.
 3. Lower leaf sheaths scabrous with red prickle-hairs; pistillate scales acute to acuminate-awned.
 4. Pistillate scale bodies glabrous or scabrous on the midvein; ligules (5-) 5.5–14 mm long; anthers 1.3–2.5 mm long. *C. caeligena.*
 4. Pistillate scale bodies pubescent; ligules 1.1–5 (–6.4) mm long; anthers 2.3–3 mm long. *C. queretarensis.*
 3. Lower leaf sheaths glabrous; at least some pistillate scales obtuse.
 5. Pistillate and staminate scales pubescent, the margins ciliate; perigynium beaks with a hyaline, flared, ciliate apex. *C. pubigluma.*
 5. Pistillate and staminate scales glabrous or scabrous on the midvein, the margins not ciliate; perigynium beaks more or less bidentulate at apex. *C. mackenziana.*
 2. Perigynium body glabrous.
 6. Lower leaf sheaths sparsely to densely scabrous with reddish prickle-hairs.
 7. Apex of inner band of leaf sheaths shallowly concave, ± thickened; perigynia 2.7–6 mm long.
 8. Pistillate scales reddish purple; anthers 2.4–3.2 mm long; perigynia 3.9–6 mm long, gradually tapered to apex. *C. chiapensis.*
 8. Pistillate scales green to pale stramineous; anthers 1.5–1.8 mm long; perigynia 2.7–4.5 (–4.8) mm long, abruptly contracted into a beak 0.6–1.4 mm long. *C. perlonga.*
 7. Apex of inner band of leaf sheaths deeply concave to “V”-shaped, thin and fragile; perigynia 2.5–3.8 mm long.
 9. Widest leaves 4.5–6.2 mm wide; spikes 6–10. *C. tenejapensis.*
 9. Widest leaves 3.5–4.2 mm wide; spikes 3–5 (–6). *C. flexirostris.*
 6. Lower leaf sheaths glabrous.
 10. Widest leaves 11–25.5 mm wide; pistillate scales truncate to obtuse, with a conspicuous scabrous awn 0.4–4.7 mm long; basal sheaths red.
 11. Ligules 7–29 mm long; pistillate scale awns 0.4–1.8 (–2.4) mm long; lower 5–8 (–12) spikes compound with up to 7 secondary spikes. *C. steyermarkii.*
 11. Ligules 1.5–4 mm long; pistillate scale awns 1.1–4.7 mm long; lower 2–3 spikes sometimes compound, secondary spikes solitary. *C. huehueteca.*
 10. Widest leaves 2.3–11 mm wide; pistillate scales obtuse to acuminate, awnless (with an awn 0.3–1.5 mm long in *C. pertenuis* and sometimes *C. caxinensis* and *C. rhyngoperigynium*); basal sheaths red or brown.
 12. Perigynia spreading, strongly curved, the distal portion of the beaks patent or even slightly reflexed, the lateral spikes therefore squarrose; achenes 1.2–1.4 mm wide. *C. rhyngoperigynium.*
 12. Perigynia ascending, straight or slightly curved, the lateral spikes not squarrose; achenes 0.7–1.1 mm wide.
 13. Basal sheaths and lower leaf sheaths red-tinged; terminal spikes androgynous or staminate proximally and distally and pistillate in the middle.
 14. Perigynia 3.9–6 mm long; widest leaves 6.5–7 mm wide. *C. chiapensis.*
 14. Perigynia 2.3–3.8 mm long; widest leaves 2.3–4.6 mm wide.
 15. Staminate scales 2.9–4.5 mm long; anthers 1.4–2.2 mm long; leaves soft, flat to plicate even near apex.
 16. Terminal spike androgynous; lower 2 lateral spikes 7–32 cm distant; lowest spike peduncle 5–15.5 cm long; achenes 1.6–2.2 mm long. *C. pertenuis.*

16. Terminal spike staminate proximally and distally, and pistillate in the middle; lower 2 lateral spikes 2.5–4.7 cm distant; lowest spike peduncle (1.3–) 1.9–2.6 cm; achenes 1.5–1.7 mm long.
C. pinophila.
15. Staminate scales 4.4–7.5 mm long; anthers 2.6–4 mm long; leaves leathery, channeled near apex.
C. caxinensis.
13. Basal sheaths and lower leaf sheaths brown; terminal spikes staminate.
17. Perigynium beaks with the apical 0.3–1.3 mm whitish hyaline; peduncles 2–4 per node at middle nodes of inflorescence; basal sheaths strongly persistent, forming a thick fibrous covering on the short rhizome.
C. tunimanensis.
17. Perigynium beaks green to purple-tinged at apex; peduncles always single at nodes; basal sheaths quickly disintegrating, not persistent.
18. Perigynia (3.3–) 3.5–5.4 mm long; terminal spikes 3.8–4.9 mm wide; pistillate portion of lateral spikes 5.4–9.8 mm wide.
C. ixtapalucensis.
18. Perigynia 2.2–3.3 (–3.7) mm long; terminal spikes 2–3.8 mm wide; pistillate portion of lateral spikes 4–6.7 mm wide.
19. Ligules 1.9–5.6 (–7.5) mm long; lower leaf surfaces smooth; achenes widest near apex.
C. brunnipes.
19. Ligules 8.5–14.5 mm long; lower leaf surfaces densely whitish papillose; achenes widest at or below middle.
C. conspecta.

Carex congestiflora Reznicek & S. González, sp. nov. (sect. *Laxiflorae*).—TYPE: MEXICO. Chiapas, Mpio. Tenejapa, ca. 1 km S of Tenejapa (Km 26.7) along road to San Cristóbal de las Casas, 16°49'03"N, 92°30'08"W, 2100 m, 10 Jul 1997, S. González & Reznicek 10472, M. González, M. Pinedo (holotype: IEB!; isotypes: ANSM! CAS! CHAP! CHAPA! CIIDIR! ctb!-herbarium of Charles Bryson, ENCB! GENT! GH! IBUG! KNK! MEXU! MICH! MO! NY! TEX! UAMIZ! US! WIS!). Fig. 2.

Plantae cespitosae; culmi 17–67 cm alti; vaginae basales brunneae, glabrae. Folia 3–6 plerumque basalia; laminae 3–40 cm longae, 1.8–7.4 mm latae; vaginae 1.8–9.5 cm longae, virides vel pallide brunneae, glabrae; ligulae 4–15 mm longae. Inflorescentia (1.4–) 6–32 cm longa; spicae (3–) 4–6; spica terminalis erecta, staminata; spicae laterales pistillatae; bracteae infimae laminis (2.6–) 4.5–29 cm longis, (1.3–) 2.6–5.8 mm latis et vaginis (0–) 0.8–5.5 cm longis. Perigynia 2.5–3.6 (–3.9) mm longa, (1.2–) 1.3–1.6 mm lata, ascendente, obtuse trigona, viridia, glabra, in rostrum contracta; rostra 0.4–0.6 mm longa. Achenium ca. 1.4–1.9 mm longum, 1.1–1.4 mm latum. Styli marcescentes; stigmata 3. Antherae 3, ca. 1.5–2.3 mm longae.

Plants caespitose in dense, leafy clumps, with short usually ascendent rhizomes; roots brown, not densely felted with root hairs; fertile culms ca. 17–67 cm tall, erect to spreading, triquetrous to slightly winged below the nodes, the angles often finely scabrous, with glabrous, brown, friable bladeless sheaths. Leaves 3–6, mostly basal; blades 3–40 cm long, 1.8–7.4 mm wide, flat, glabrous, the margins and midrib finely antrosely scabrous distally, the widest leaves 3.5–7.4 mm wide; leaf sheaths 1.8–9.5 cm long, loosely enveloping the culms, smooth except for the sparsely ciliate-serrulate angles, green to brownish; inner band of sheaths hyaline, delicate, very finely veined, the apex shallowly concave to truncate or even slightly prolonged on the uppermost sheaths, thin and easily splitting; ligules (1–) 4–15 mm long, sharply acute (inverted “V”-shaped), the narrow free portion whitish hyaline, entire. Vegetative shoots ca. 14–40 cm tall; leaves 3–6, similar to those of fertile culms; pseudoculms ca. 1.5–10 cm tall. Inflorescences ca. (1.4–) 6–32 cm long, with the upper 3–5 spikes strongly overlapping and usually with a remote lower spike, the lowest 2 spikes (0.6–) 4.1–25 cm distant; spikes single at nodes,

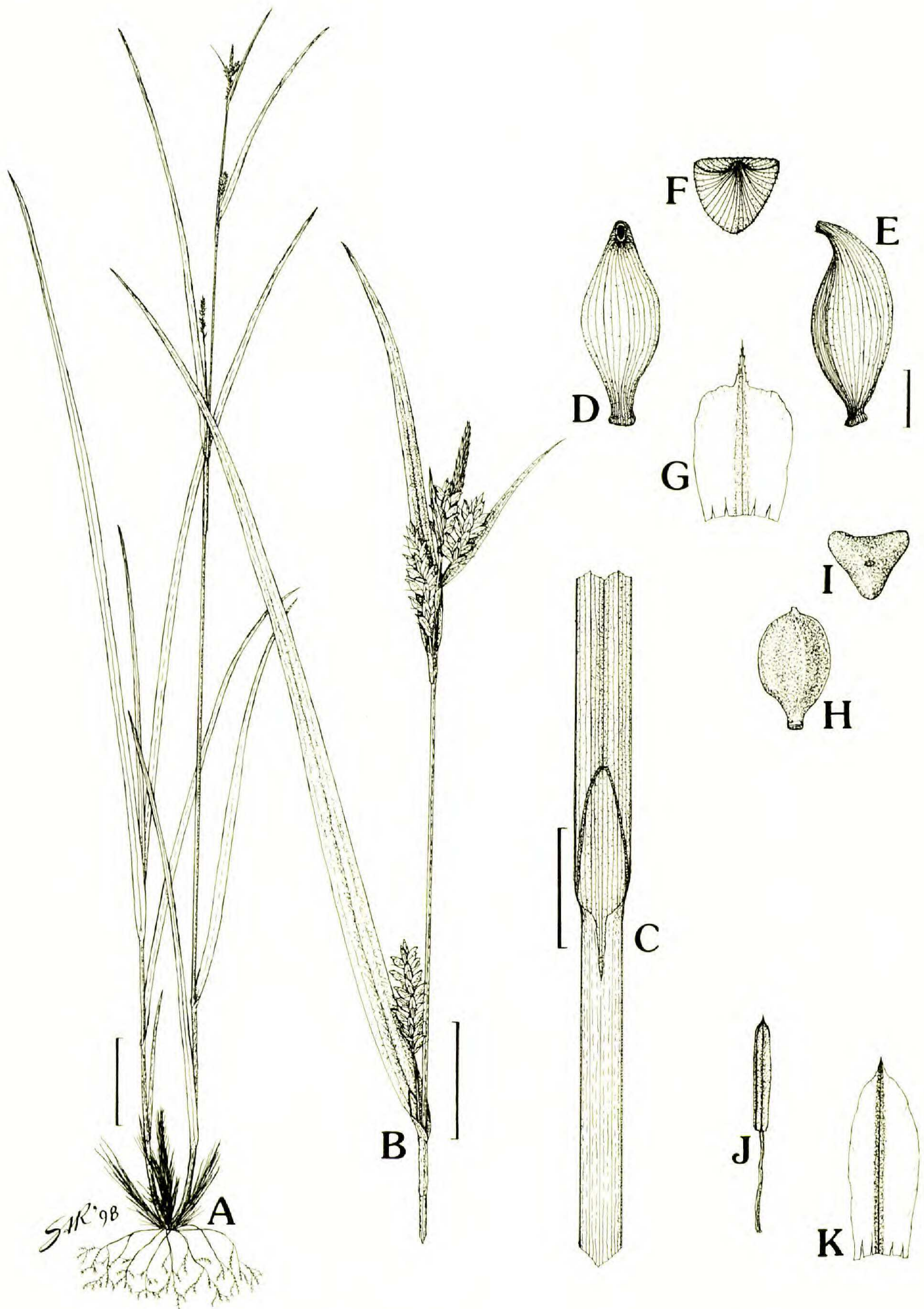


FIG. 2. *Carex congestiflora*. A. Habit. B. Distal portion of inflorescence. C. Sheath and ligule. D. Perigynium, front view. E. Perigynium, side view. F. Perigynium, top view. G. Pistillate scale. H. Achene, front view. I. Achene, top view. J. Stamen. K. Staminate scale. Scale: A, bar = 6 cm; B, bar = 2 cm; C, bar = 1 cm; D-K, bar = 1 mm. Drawn by Susan Reznicek from the type.

the lower erect to spreading, the uppermost ascending to erect, on stiff, filiform, scabrous peduncles; lowermost spikes with peduncles (0.3–) 1.4–12 (–22) cm long, the uppermost lateral spikes essentially sessile; lowermost bracts with blades (2.6–) 4.5–29 cm long and (1.3–) 2.6–5.8 mm wide, sheaths (0–) 0.8–5.5 cm long, otherwise similar to the leaves, the uppermost bracts much reduced, narrower than and not concealing the spikes. Spikes (3–) 4–6, the terminal staminate, the lateral pistillate. Terminal spikes 3.5–16 mm long, 0.8–2.5 mm wide, and ca. 3–16-flowered; peduncles 1.5–6 (–14.5) mm long. Lateral spikes 6.5–21 mm long, 3.3–5.2 mm wide, ca. 5–22-flowered, the internodes between the lowest scales ca. 0.8–2.4 (–3) mm long. Pistillate scales 2.3–4.5 (–5.6) mm long, 1–1.7 mm wide, oblong-ovate, obtuse to truncate or even retuse, glabrous, green to stramineous with broad hyaline margins, with a prominent, distally scabrous midvein excurrent into an awn 0.4–2.2 mm long and 6–8 faint lateral nerves. Staminate scales 2.6–5.5 mm long, 0.9–1.3 mm wide, narrowly elliptic to narrowly ovate, obtuse to acuminate, glabrous, green to stramineous with narrow hyaline margins, with a prominent midvein often excurrent as a short awn up to 1.3 mm long, lateral nerves barely discernible. Perigynia 2.5–3.6 (–3.9) mm long, (1.2–) 1.3–1.6 mm wide, widest at ca. 1/2–3/5 of the total length, ascending, obtusely trigonous with more or less flat to convex, elliptic sides, green, glabrous, more or less cuneately tapered to the base, prominently 31–39-nerved, asymmetrically tapered into a gently outcurved to deflexed beak; beaks 0.4–0.6 mm long, green, smooth, the apex oblique and finely ciliate. Achenes 1.4–1.9 mm long, 1.1–1.4 mm wide, trigonous with more or less flat, elliptic to obovate sides, tightly enveloped by the perigynium, brown, very finely papillate, tapered to the base. Styles withering; stigmas 3. Anthers 3, ca. 1.5–2.3 mm long.

ADDITIONAL SPECIMENS EXAMINED. **Mexico.** CHIAPAS: Mpio. Tenejapa, steep, moist slope of the sumidero in Tenejapa Center, 6600 ft, 11 Jul 1965, *Breedlove 10773* (MICH); Mpio. Tenejapa, near Colonia Ach'lum, 16°46'50" N, 92°26'55" W, 2550 m, 11 Jul 1997, *S. González & Reznicek 10494*, *M. González, M. Pinedo* (CIIDIR, MEXU, MICH).

Carex congestiflora is locally frequent in humid open forest understories, clearings, and even pastures, apparently mostly on thin soils over limestone rocks. Like one of its North American relatives, *C. blanda*, *C. congestiflora* is evidently capable of being somewhat weedy in areas where it is frequent. In mid-July, most specimens seen had already shed most of their perigynia, so peak fruiting probably occurs from mid-June through early July. Besides the localities cited above, the species was also seen on the moist, grassy floor of a karst ravine ca. 1.5 km NE of Tenejapa at 16°50'48"N, 92°29'41"W, but the plants had all shed their perigynia and no specimens were collected. The epithet "*congestiflora*" refers to congested upper portion of the inflorescence, where the upper 3–5 spikes are strongly overlapping.

Carex sect. *Laxiflorae* Kunth is a complex section of perhaps as many as 25 species characterized by perigynia with numerous (mostly 25–39) fine nerves and acutely trigonous or even winged culms (Naczi 1992). It is most diverse in eastern North America, with a single species in the Pacific Northwest, perhaps 7 species in eastern Asia, and one in Europe (Naczi 1992). The first report of a member of this section in Mexico was by Hermann (1974), who reported this species from Tenejapa, Chiapas, as *C. laxiflora* var. *serrulata* F. J. Herm. This variety was first described from southern Indiana and Pennsylvania (Hermann 1938), and subsequently the name has been applied to collections from throughout much of the

southeastern United States. It remains, nevertheless, a poorly known entity in need of systematic study. Rediscovery of the Mexican plants in 1997 allowed, with now ample material, the critical comparison of Mexican specimens with all other members of *Carex* sect. *Laxiflorae*, which disclosed that they represent a distinct species.

Carex congestiflora is quite similar to several eastern North American species, most especially *Carex crebriflora* Wiegand, *C. blanda* Dewey, and, to a lesser extent, plants referred to *C. laxiflora* var. *serrulata*. These species all have the spikes in the upper part of the inflorescence congested with the uppermost 2–4 lateral spikes overlapping each other and the terminal staminate spike. They also all have short (mostly 7–21 mm long) and densely-flowered lateral spikes, at least some upper bracts long-exceeding the terminal spike, short-peduncled to nearly sessile terminal spikes, and brown bases. None of the several species in Eurasia that appear also to belong to sect. *Laxiflorae* have inflorescences with the upper spikes strongly overlapping.

Carex congestiflora perhaps most closely resembles the common, variable, and widespread *C. blanda*, distributed throughout most of the eastern United States and southern Canada. *Carex congestiflora* differs most strikingly from *C. blanda* in having perigynia that are basically elliptic in outline, widest near the middle. *Carex blanda* has perigynia that are strongly obovate, widest at about 3/5 to 2/3 of the total length. Also, in *C. blanda*, the perigynia are 1.5 to 1.8 times as long as the achene bodies, but in *C. congestiflora* (and *C. crebriflora*) the perigynia are 1.8–2.3 times as long as the achene bodies. *Carex blanda* also usually has the angles of the bract sheaths much more strongly ciliate-serrulate than *C. congestiflora*. Like *C. congestiflora*, *C. blanda* has 2–5 lateral spikes. *Carex congestiflora* also resembles *C. crebriflora*, a species of the southeastern United States, mostly on the coastal plain from southeastern Virginia to Texas (Bryson 1980). *Carex crebriflora* differs most obviously in having larger perigynia (3.6–) 3.8–4.9 (–5.4) mm long and acute-awned to acuminate-awned pistillate scales versus perigynia 2.5–3.6 (–3.9) mm long and pistillate scales obtuse, truncate, or retuse with an awn in *C. congestiflora*. In addition, *C. congestiflora* mostly has 3–5 lateral spikes, whereas *C. crebriflora* usually has only 2–3. Plants referred to *C. laxiflora* var. *serrulata* differ from all the other species with congested spikes, including *C. congestiflora*, in having the upper inflorescence bracts lanceolate, spathe-like, and more or less enveloping the upper spikes. *Carex congestiflora*, like *C. blanda* and *C. crebriflora*, has the upper bracts reduced, linear, and not concealing the spikes. *Carex laxiflora* var. *serrulata* also has only 1–3 lateral spikes.

A cautionary note here is that the illustration accompanying Hermann's (1974) treatment of *Carex laxiflora* var. *serrulata* in Mexico is not that of the Mexican plant and does not resemble our Fig. 2. It is an illustration of *C. laxiflora* var. *laxiflora* reprinted from Mackenzie (1940) and drawn from plants collected in the United States in Indiana and West Virginia.

To place *Carex congestiflora* better in the context of similar species in *Carex* sect. *Laxiflorae*, a key is provided below to all species of the section that can have the upper spikes of the inflorescence strongly overlapping. Some of the species included in the key, such as the broad-leaved *C. albursina* Sheldon and the red-based *C. ormostachya* Wiegand and *C. manhartii* Bryson, are presumably quite unrelated to *C. congestiflora*. Others, including *C. laxiflora* var. *laxiflora*, only rarely have the upper spikes congested, and are also presumably only distantly related.

KEY TO "CONGESTED-SPIKED" SPECIES OF CAREX SECTION LAXIFLORAE

1. Perigynia 8–18-nerved, with 2 nerves prominent and others much fainter and of unequal strength. *C. leptoneuria*.
1. Perigynia (22–) 25–39-nerved, most nerves \pm equally prominent.
 2. Larger perigynia 4.8–6.5 mm long; pistillate scales 1.9–2.3 mm wide; northwestern North America. *C. hendersonii*.
 2. Larger perigynia (2.3–) 2.5–4.9 (–5.4) mm long; pistillate scales 1–1.7 mm wide; eastern North America (*C. blanda* occurring rarely as far west as the Rockies).
 3. Widest leaves of vegetative shoots 15–40 (–50) mm broad; widest inflorescence bracts (6–) 7.5–18 mm broad; most pistillate scales broadly obtuse to truncate, sometimes with a small mucro. *C. albursina*.
 3. Widest leaves of vegetative shoots 3.5–13 mm broad; widest inflorescence bracts 3–7.5 (–8.5) mm broad; pistillate scales acute to acuminate-awned, if obtuse to truncate or retuse, then awned.
 4. Bladeless basal sheaths and sometimes lowermost portions of leaf sheaths tinged with reddish purple; edges of bract sheaths (especially the edge corresponding to the bract midvein) often finely granular-papillose.
 5. Perigynia 2.4–3.4 mm long, abruptly contracted to a very short, strongly bent beak 0.2–0.5 mm long. *C. ormostachya*.
 5. Perigynia 3.4–4.2 mm long, tapered to an essentially straight beak 0.6–0.9 mm long. *C. manhartii*.
 4. Bladeless basal sheaths and lower leaf sheaths pale to dark brown, completely lacking reddish purple coloration; edges of bract sheath smooth to conspicuously ciliate-serrulate, but not papillose.
 6. Bracts of the uppermost 2 lateral spikes lanceolate, mostly 3–7 cm long and 2–5 (–7) mm wide, 6–12 times as long as wide, spathe-like, \pm enveloping the spikes and concealing them when viewed from the abaxial surface. *C. laxiflora* var. *serrulata*.
 6. Bracts of the uppermost 2 lateral spikes linear, mostly 0.7–3 cm long and 0.7–2 (–2.5) mm wide, 10–15 (–20) times as long as wide, not enveloping and partly concealing the spikes.
 7. Perigynia distinctly obovate in outline, widest at ca. $3/5$ to $2/3$ of the total length, 1.5–1.8 times as long as the achene bodies, the beak sharply deflexed; angles of bract sheaths conspicuously ciliate-serrulate, sometimes also \pm corrugated. *C. blanda*.
 7. Perigynia ellipsoid in outline with both ends gradually to strongly narrowed, widest at ca. $1/3$ to $3/5$ of the total length, 1.8–2.3 times as long as the achene bodies, the beak gently outcurved to somewhat deflexed; angles of bract sheaths smooth to sparsely ciliate-serrulate.
 8. Longest lateral spike (14–) 20–40 (–51) mm long; internodes between lowest scales (2.2–) 2.4–7.5 (–10.5) mm long; the spikes loosely flowered, when shorter than 20 mm, then only 4–7-flowered. *C. laxiflora* var. *laxiflora*.
 8. Longest lateral spike 7–21 mm long; internodes between lowest scales 0.8–2.4 (–3.5) mm long; the spikes densely flowered.
 9. Larger perigynia (3.6–) 3.8–4.9 (–5.4) mm long; lower pistillate scales acute-awned to acuminate-awned; lateral spikes 2–3 (–4). *C. crebriflora*.
 9. Larger perigynia 2.7–3.6 (–3.9) mm long; lower pistillate scales obtuse, truncate, or retuse and awned; lateral spikes (2–) 3–5. *C. congestiflora*.

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